

THE
DEPARTMENT OF WOODLOT MANAGEMENT
MACDONALD COLLEGE
AND
THE MORGAN ARBORETUM ASSOCIATION



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ANNUAL REPORT
to 31st May, 1970.

MORGAN ARBORETUM ASSOCIATION
AT MACDONALD COLLEGE, P.Q.

Executive Officers 1969-1970

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Mr. R. A. Irwin	Dr. H. Rocke Robertson, Principal
	Dr. G. H. Tomlinson

Staff — Department

- J. R. Bider, B.Sc., M.Sc., Ph.D. (Montr.), Associate Professor, Wildlife Biology (Huntly-Drummond Fund).
W. H. Brittain, Ph.D. (Cornell), D.Sc. (U.B.C.), B.S.A., LL.D., F.A.I.C., F.R.S.C., Scientific Adviser.
A. R. C. Jones, B.Sc.F. (Tor.), M.Sc. (Syr.), Associate Professor and Chairman.
J. D. MacArthur, B.Sc.F. (U.N.B.), Assistant Professor and Curator.
Miss M. E. Munro Kerr, Office Manager.
Mrs. Dorothy Robertson, Secretary.
David Algar, B.Sc.F., Research Associate.
Mrs. Margaret Austin, Betula Studies.
Mrs. Janet Fisher, Betula Studies.

Staff — Arboretum

- R. J. Watson, Foreman.
G. S. Martin, Technician.
H. R. Brevoort, Technician.
R. M. Irwin, Forest Technician.
R. Magill, Forest Technician.
J. Aulis, Woodsman.
O. Watson, Woodsman.

THE MORGAN ARBORETUM ASSOCIATION

It is a pleasure to present the highlights of the year's (1st of June, 1969 — May 31, 1970) activities to the membership. In this Annual Report it is proposed to also report on activities in the Department of Woodlot Management as the Morgan Arboretum is operated by members of the staff of the Department.

Message from the President

I am pleased to report that we have had a very successful year and it is most encouraging to see the number of members that are availing themselves of the privileges of the Morgan Arboretum. Unfortunately, as usual we are very short of money to support the Arboretum program and greater efforts will have to be made to find additional supporters who can help to carry the expenditures which we feel are extremely worthwhile.

Membership

At the end of the year contributions in support of the Arboretum and for the expansion of its educational and scientific programs stood at 974 individuals and families, 39 corporations and associations, 20 honorary members including the honorary president and director with a total of 167 new members in all categories with one of these being in the corporation class. The continued support of the Arboretum's program by private members and corporations is appreciated and essential to an ongoing program. The Arboretum would have a short life without the financial assistance provided through memberships. We are finding more and more the need for additional expenditures to maintain the area in its pristine condition and to prevent unauthorized persons from using the area who are not prepared or willing to help support it.

I am pleased also to report on President R. E. Kirkpatrick's interest in the area. Both he and Mrs. Kirkpatrick visit the Arboretum frequently and so far he reports that they have only been lost once, marooned once, and one fatiguing outing that convinced him he needed to take the Y.M.C.A. fitness class to condition himself for another year in office. Kirk also arranged a meeting of the Board of Directors in Montreal in September to look at the various types of support now provided. The meeting, chaired by Spike Irwin, was well attended and sincere thanks go to those who contributed ideas and time to this session. Continual rethinking of the Arboretum program and how it fits in with the many organizations and individuals who support it are necessary to maintain its modern outlook. Furthermore, increasing financial support is needed if the Arboretum is to be properly maintained and expanded to meet the tremendous increase in demand for its many services.

This has been the year of sudden awareness of a deteriorating environment. The Arboretum is also feeling these pressures as it is subjected to increasing use; compaction of trails, littering, use of garbage containers by transients and many kinds of trespass on weekends which include snowmobile users, motorbikes, skiers, hikers and casual visitors of one kind and another. This has made the job of gatekeeping extremely difficult and necessitated putting on a gatekeeper this winter. This dramatically increased the number of members and pleased those who were already members as there had been complaints of the number of unlawful visitors. The data which compare the number of visitors by

month give some indication of the increase in visits and show the extensive use of the Arboretum for winter recreation:

	June	July	Aug.	Sept.	Oct.	Nov.	Feb.	March	April	May
Members	616	449	847	1077	1636	519	1361	1572	1011	1292
Paying										
Visitors	146	85	151	216	468	62	388	251	208	246
No.										
turned										
away	455	376	754	585	677	128	366	469	295	536
Groups,										
Scouts										
Guides										
etc.	505	349	646	753	1312	276	391	435	435	620

making a total of 22,962 visitors to the Arboretum recorded at the weekends. Expenses totalled \$644.00, with receipts from passes sold at the gate amounting to \$1,252.75. This year for the second time costs of manning the gate on weekends was exceeded by receipts.

I must advise of the passing of an old friend and long-time supporter of the Arboretum, Mr. F. H. Dillingham. Mr. & Mrs. Dillingham have supported the Arboretum from its early days as Riding members. To Mrs. Dillingham and members of her family we extend sincerest sympathy.

Staff

Each year seems busier than the last — perhaps this is just part of the aging process. Unfortunately, Dr. Brittain has spent part of the year in hospital, first at Lachine, more recently in the Veterans' Hospital, Ste. Anne de Bellevue. However, he has managed to publish an eighth birch paper with Dr. Grant covering the Grand Manan collections. The National Research Council grant for *Betula* research has been renewed and Mrs. Austin is carrying on the laboratory work. She has also prepared an exhibit on the highlights of the Canadian Birch collections for the Canadian Botanical Association meeting held at Laval University in June. Dr. Brittain also took time to set down the general details of the Birch project and a history of the early years of the Morgan Arboretum. These two articles are found under "Special Events".

Dr. Roger Bider, who holds the Huntly-Drummond Fund appointment, started the year by being appointed to the Science Council study group for Fisheries and Wildlife policy in Canada. His partners in this assignment were Dr. Jim Kerswill, Director, Arctic Fisheries Biology Laboratory and Dr. Douglas Pimlott, University of Toronto. The work involved a survey of fish and wildlife activities across Canada with visits to Universities and Provincial and Federal Laboratories. It provided a unique opportunity to review new developments, progress and the teaching of these disciplines in Canada. Dr. Bider has also been in demand for many speaking engagements and addressed the following groups: A symposium sponsored by the New York Society of Wildlife and Fisheries Biologists at Syracuse, N.Y., "The Animal Community, a Possible Recreation Resource, Twenty Years From Now"; The Junior Section, Montreal Zoological Society, "The Use of Sand Transects in Science and Recreation (with appropriate variations)"; Les Chasseurs, Pêcheurs de Yamaska, St. Hyacinthe; La Société Biologique de l'Université de

Montréal; The Junior Society for the Prevention of Cruelty to Animals, Montreal; Pointe Claire Unitarian Church Study Group, "Man's Impact on His Environment"; The Department of Zoology at McGill, "Studies in Community Ecology".

Meetings attended include Symposium de la Conservation, Montréal; The Quebec Wildlife Federation, Quebec; The Canadian Society of Zoologists, Ottawa; The Canadian Society of Wildlife & Fisheries Biologists, Ottawa; The Canadian Wildlife Federation, Ottawa; The Canadian Audubon Society Annual Meeting, Winnipeg.

His final talk for the year-end will be to address the members at the Annual Meeting of the Morgan Arboretum Association on June 9. In addition to these extra-curricular activities, he is a member of the following councils and committees: Conseil Supérieur de la faune, Ministère du Tourisme, Chasse et Pêche; 2nd Vice-President, Montreal Anglers & Hunters Inc.; Director of the Quebec Wildlife Federation and the Canadian Audubon Society; Secretary, Quebec Chapter, Canadian Society of Wildlife & Fisheries Biologists and representative of the Canadian Society of Wildlife & Fisheries Biologists to Canadian Wildlife Federation.

In his regular teaching work he had 32 students registered in his Ecology and Conservation Course and supervised the research of five graduate students, besides being in constant demand for information on wildlife subjects. His method of animal censusing has resulted in a recent grant from the National Park Service to introduce sand transects for improved interpretational programs in National Parks across Canada. Current publications appear in the "Publications" part of this report.

Professor Dan MacArthur in his polyvalent role as Professor Woodlot Management and Curator, Morgan Arboretum, supervises and coordinates the program in the Arboretum, organizing sales of products, conducting field days, tours and providing an information service for those who call daily for assistance on a great variety of subjects. He has also been in demand for several Manpower training courses, talks on Forestry as a Career and the Morgan Arboretum besides giving radio interviews on subjects of seasonal forestry interest. His course for undergraduate and graduate students in woodlot forestry involved 16 students. He has been responsible for supervising the very successful sugaring and nature conservation tours with the help of Oliver Watson and David Algar, a research associate in the Department. These tours are described in more detail under "Special Events". He is the Editor, Woodlands Section, Pulp & Paper Magazine of Canada. He has chaired the National C.I.F. Finance Committee and is also Chairman of the Champlain Section, Canadian Institute of Forestry. This year seven departments from the Faculty of Agriculture participated in High School Enrichment programs. Interested high school students visit the college to look into various aspects of the sciences available at Macdonald. Six high school students came for five sessions on tree evaluation in forestry in the Morgan Arboretum. Dan was also present at the following meetings this year: C.I.F. Annual Meeting, Prince George, B.C.; Woodlands Section, Canadian Pulp and Paper Association, Montreal; The Woodhandling Symposium, Ottawa. The substantial number of publications to his credit are listed under "Publications". The annual Woodlot Conservation Evening Course had another successful session with all members of the Department participating.

Dan is also responsible for entertaining visiting scientists and other interested visitors who wish to see the Morgan Arboretum. This year was notable in that plant material was supplied to the National Capital Commission and to start an arboretum at the University of Guelph under Dr. Hilton's direction.

Mr. David Algar, Research Associate, in addition to pursuing part-time graduate studies, has carried out field work and prepared management plans for cooperators in the Chateauguay Valley Woodlot Assistance program. He has developed an effective method of inventoring cooperator properties. Woodlot plans for a good proportion of these woodland owners are now available to them. The development of meaningful nature conservation tours for youth groups and the training of the eleven students hired this spring to act as bilingual guides for the visiting schools has been another of Dave's responsibilities. The enthusiastic response to these tours can largely be attributed to his interest and the enthusiasm of an excellent group of guides. The Garnet M. Strong Memorial Fund aids this important work. Dave's thesis project, "Forest Owner and Forest User perception and awareness of the Forest Environment", is based on his work in the Arboretum and with woodlot owners in the Chateauguay Valley. Dave has also helped with the teaching work as has John Ambrose, a graduate student who has recently completed graduate work in the Department. John's thesis, "Soft Maple Productivity Studies", deals with the potential productivity of soft maple coppice stands on imperfectly drained land in the Chateauguay Valley. He is now employed by the Planning Unit, Department of Lands and Forests.

The secretarial staff in the persons of Mary Munro-Kerr and Dorothy Robertson have handled the mountains of correspondence and the large number of demands for their services with efficiency and dispatch. The telephone, typewriting, duplicating and administrative duties in the office and the Arboretum are extremely heavy. It is a continuing mystery how this twosome manage to cope with these never-ending and mounting chores. Sincere thanks for their reliable and loyal service come from all members of the staff. Bob Watson and his crew of Harold Brevoort, Galen Martin, Bob Magill, Dick Irwin, Oliver Watson and John Aulis are to be congratulated on the excellent appearance and condition of the Arboretum. The increasing pressure of visitors all through the year makes their daily work and its results of considerable interest and importance to the Arboretum's image and for the continuing support from the membership.

Arch Jones had a brief look at forestry in Saskatchewan last summer; this is reported on below. He was also appointed to le Conseil de Recherche et Développement forestier du Québec in October. The Conseil has met monthly in order to plan the orderly development of forestry research in the province. Courses taught included the Diploma Course in Farm Forestry and the evening course on Woodlot Conservation. This year a workshop was organized in cooperation with Bill Pollock, Timmerlinn Woodland Services at the Donald Webster Woodlot near Dalesville, Quebec. This field day introduced over 100 woodlot owners to the management and silviculture of coniferous and hardwood stands for forestry and aesthetics. Outside talks and sessions included a lecture on Woodlot Management to the Manpower Training Course at Ormstown;

an illustrated talk on the Morgan Arboretum to the Women Associates of McGill; a March meeting on maple syrup with maple producers in the Chateauguay Valley with Dr. Jim Marvin, University of Vermont, a panel discussion on the "Future of Agriculture in the Seventies" at Ormstown. Meetings at which presentations were made included the Second Woodlot Extension Specialists Seminar at Kitchener, Ontario. The theme of this meeting sponsored by the Canadian Forestry Association was "Extension Forestry — Where Are We Going?" Delegates from P.E.I., New Brunswick, Nova Scotia, Quebec, Ontario and the Canadian Forestry Service participated in the discussion and field trips to areas of interest in the region. Next fall the Seminar is to be held in Nova Scotia. Another 3-day Seminar, attended in February, and sponsored by the Ontario Professional Foresters' Association on "Silviculture and Management of Recreation-Use Forests" was of considerable immediate interest to work now underway in the Arboretum. The Board of Directors of the Corporation des Ingénieurs Forestiers met four times during the year and the Annual Meeting of this body took place in October. The Woodlands Section, C.P.P.A. Annual Meeting in Montreal during March was also attended. As Secretary of the New Orientation for the Faculty of Agriculture Committee there has been a good deal of preparation, planning and discussion with staff and students as to where the Faculty of Agriculture should be going in the next 10 years. This committee submitted its final report to Faculty and the report formed the basis for a week's workshop in revising the Faculty of Agriculture curriculum this spring. The name of the Faculty has been changed to "The Faculty of Agricultural and Environmental Sciences". A Resources Development Stream for students interested in this kind of training to include our Department, Economics, Continuing Education and Soil Science was proposed and has been approved by our Faculty. These recommendations are now under consideration by the University's Academic Policy Committee.

Arboretum Special Events

During the past year four outdoor events were organized for members of the Morgan Arboretum Association. In October, some members attended a woodlot owners' workshop held on the property of Mr. Donald C. Webster at Dalesville, P.Q., in the Laurentian region. The accent was on multiple use management with recreation and aesthetic forestry an important part of the programme.

A fall field day was held in the Morgan Arboretum featuring demonstrations of the latest models of chain saws. Later in the winter, in March, a members' outing was organized for skiing, snowshoeing, bird-watching, hiking etc. Both these visits were well attended and ended with coffee and conversation in the Chalet Pruche.

In January the Laurentian Ski Zone held one of their week-end ski touring meets in the Arboretum. This was a second such visit and presumably the terrain and trails in the Arboretum are proving attractive.

Four sugaring-off parties were held in 1970. The traditional Morgan Arboretum Association members' party drew some 1,200 people — enough to produce a noticeable parking problem. The Macdonald College Club party was held in the evening and featured a sleigh ride. The McGill Graduate Society's party was attended by upwards of 1,500 people, and some 900 attended a special party for the municipality of Ste. Anne de Bellevue.

Youth Group Tours

Educational sugaring tours for school classes continued at the same level as in 1969 and with good results. This facility is now operating at peak capacity with about 3300 students attending the demonstration of maple sap collecting and conversion to syrup with sampling of maple taffy or sugar on snow the final, and most popular, part of the event. In 1970 the tours began on March 16 and ended on April 20.

This year the tour guide was Oliver Watson who did an excellent job under conditions that were somewhat trying at times. Able assistance was provided by David Murray from time to time during the season.

Nature Conservation Tours have become a major operation in the short space of three years. The tour guide staff, directed by David Algar, B.Sc. in Forestry, has grown to eleven members. During the months of May and June 10,000 to 14,000 children will participate. As experience is gained the whole program becomes more sophisticated. This year a number of new features have been added such as bird blinds at feeding stations, traps for different classes of insects, soil pits, a sand track, etc. These, plus intensive preparation of guides and their real enthusiasm, are all positive factors.

Much effort is being directed to obtaining evaluations of methods, approaches, and ideas through feedback from teachers and special questionnaires completed for each tour by each guide. It is hoped that we will learn much about the process of introducing young children to the fascinating natural world. David Algar is conducting a serious study of this process based on the literature, the experience with children on our nature tours, his work with woodlot owners in Huntingdon County, and views of Morgan Arboretum Association members regarding forest recreation. His findings will form the basis for a master's thesis on human knowledge and appreciation of forest values; in essence how people cope with the forest situation and how they express themselves in it.

About one third of the 1970 nature tours will be given in French and it is evident from demand that the French proportion could be one half or even greater. Demand also indicates that we may expect this program to continue to grow and must begin to plan now to accommodate the maximum number possible.

Fortunately, competent enthusiastic guides are available for this work. In 1970 we had a surplus of applicants with excellent qualifications. The following are the names of the 1970 staff:

David Algar		Macdonald
Karen Lapsley	PABS I	"
Janet Yuill	" I	"
Eleanor Otto	Food Science IV	"
Winnifred Tibbitts	Agriculture I	"
Odette DesRosiers	Phys. Ed. II	"
Penelope Swales	Education II	"
Terry Goodwin	" II	"
Joan Young	" II	"
Carolyn Moore	Food Science II	"
Rosemary Algar	Occup. Therapy III	McGill
Elizabeth Riley	Physiotherapy III	McGill
Oliver Watson	High School	Lindsay Place

During 1969 a short article entitled "Education for Recreation" was published in the Macdonald Journal based on the Nature Conservation Tours. The article explains briefly what the nature tours are and why we believe that they are important. For example:

"To plan efficient and rewarding use of the nature recreation resources that are within reach of the bulk of the population, much must be learned and the knowledge used with skill and imagination. For best results, participants need a greater awareness of what they are participating in. The opportunity that the nature program provides for children to become aware of the world in which they live is the real justification."

Wherever possible we have supported the nature study activities of Cubs, Scouts, Brownies and Guides. Special courses in conservation for Girl Guides are an annual event and in 1970 the Department will assist in a special course on nature and conservation for Guide leaders.

Special educational tour are frequent events. During the past year, for example, the Arboretum was visited by a large group of Ontario 4H Club members, a group of 150 high school students, a group of young farmers, and 12 forest engineers of the Inventory Service of the Quebec Department of Lands and Forests.

High School Enrichment

During February 1970 the Department of Woodlot Management participated in the second high school enrichment programme, directed by Professor E. S. Idziak, Department of Microbiology. The students spend four half-day work periods at Macdonald on research type projects.

In 1970 eight students, representing four high schools, were involved in a Woodlot Management study of tree growth layer analysis as a means of studying growth and the influence of intrinsic and extrinsic controls upon tree form development. The interest displayed by the students, and the instructors' enjoyment of this activity were indications of its success.

The Rielle Thomson Award

We have been fortunate in keeping this award for contribution to public knowledge of the forest in the family as it were. It was won by Fred Harrison last year and presented this year for the work being done by the Department in Conservation Education in the Morgan Arboretum. It is very gratifying for all those involved in the Department to have this educational work recognized in this manner. It was also a great privilege to receive the award from the donor himself during the Annual Luncheon of the Canadian Pulp and Paper Association in March.

THE BIRCH PROJECT

The Morgan Arboretum is a natural hardwood area, the only coniferous trees being a scattering of white pine in one portion and hemlock in another. When it was decided to make a detailed study of one hardwood species, white birch (*Betula papyrifera*) was selected. The reason for doing so was that it was a species of continental distribution as well as having proved itself to be the most generally successful hardwood for reforestation purposes, on account of its resistance to rodent damage — that plague of many young hardwoods.

Some collecting in the Maritime Provinces was carried out in 1948-1959, but in the year 1961 there began a project involving a seed collection of this species from the entire country. The next year, through the courtesy of the Canadian Department of Agriculture, a survey of all the western provinces was made and the seed collected was germinated, planted in the Arboretum, and a chromosome determination made from the root tips of the young seedlings. In 1963 Professor Jones and Dr. Brittain made a survey of the Yukon and the MacKenzie River Valley as far north as Inuvik, bringing back a rich collection of seed from these territories. It should be noted that in the districts mentioned the typical *Betula papyrifera* is largely superseded by a closely related species, *Betula resinifera* Britton, which some botanists consider to be a mere variety of *B. papyrifera*. Later collections were made in Ontario, Quebec, Newfoundland, the Maritime provinces and Labrador, the latter with the valuable assistance of the Provincial Department of Forestry.

With the approach of the celebration of Confederation, it was decided to make this tree the subject of our Centennial Project. This species was chosen, not only because we had the material, but because of its wide-spread distribution and because it was associated in a meaningful way with the history and development of Canada. For all these elements were combined in the familiar white birch tree which lines roadsides, lakes and streams throughout the entire breadth of the land or to quote the words emblazoned on the National Coat of Arms "A Mari Usque Ad Mare".

Historically the birch tree is linked with one of the most significant and romantic eras in our national development — the era of the fur trader and voyageur whose activities played such a vital role in shaping our country within its present boundaries. The famous voyageur trail through the heartland of Canada was the homeland of the white birch whose shining coat in the form of the light bark canoe was the basis for an amazing system of inland water transportation, permitting communication between all parts of the vast domain. As already indicated, the task of collecting the seed had involved journeys over thousand of miles of woodlands, prairies, tundra and mountains. When grown to seedling size the trees were established as an avenue of trees forming the "Canada Birch Trail" composed of specimens representing every province and territory in Canada from Port-au-Basque, Newfoundland in the east to Victoria, British Columbia in the west, and Reindeer Station in the far north.

In October, 1967, it so happened that the premiers of Canada were assembled together at McGill University to receive honorary degrees. Advantage was taken of this occasion by having each of them dedicate a tree to their particular province. During the ceremony, Dr. Brittain

pointed out to the assembled premiers that they were not merely participating in a simple tree planting ceremony but were assisting in the symbolic dedication of this unique trail on behalf of the people of their province — a trail which might be taken to reflect alike the unity and diversity of our country.

The particular trees planted by the representatives of each province are now assembled as a line of trees to which the name "The Premiers' Trail" has been given.

The Early Years — Morgan Arboretum

The original Morgan Estate resulted from the consolidation of twenty-two farms — the typical long and narrow French-Canadian farms, half of which opened on the Centre Road and half on the Ste. Marie Road. All of these farms were consolidated into a single property by the late James Morgan. The result was an area consisting of some 352 acres of natural woods together with surrounding farm lands, the latter being used by the late Harold Morgan as a farm.

In the year 1915, the farm property was rented to private interests which used it as a dairy farm. During the period the property was under rental, the condition of the farm gradually deteriorated through the lack of good cultural and fertilizing methods, the filling up of drains, the lack of proper maintenance, etc. During all this period, the woods themselves remained intact except for an annual cut of an undetermined amount.

In the year 1941, the possibility of McGill University acquiring the Morgan property was explored on the initiative of the late Cleveland Morgan, an eminent amateur horticulturalist and botanist who had long cherished the idea of securing the permanent preservation of the woods. This eventually resulted in an agreement to sell the property to the University for a sum which would cover the estimated value of the farm lands alone. Pending the final agreement, the estate was rented to the College for the sum of \$1600 per annum. When, however, the arrangements for sale were finally completed in 1945, the total amount of 910 acres was obtained for the sum of \$90,000. Later, in order to secure a suitable piece of land for nursery purposes, an additional 2.86 acres was obtained for the price of \$7,500. The financial arrangements for the purchase of this property was the result of the generosity of the late J. W. McConnell and of the Provincial Government under Premier Godbout.

As finally laid out, the Arboretum included 362 acres of natural woods, 100 acres of which could be used for reforestation purposes, 40 acres for floral groups, 23 acres for an ecological preserve, 15 acres taken up by roads, trails, buildings and swamp. For the period of 1941-45, the property was under the custodial care of Professor A. R. Ness of the Farm Department, but, during that period, little was done as far as the woods were concerned. However, with the final acquisition of the property in 1945, an active program of planting was begun. Previous to that time only a light cutting had been done in the year 1945, consisting of the removal of some of the over-aged and defective trees.

With the sale of the property, an informal agreement was entered into whereby 350 acres of the woodlands should be set aside for an Arboretum. However, nothing was said about the surrounding farmlands, although it was apparently assumed that these would continue to be used for agricultural purposes.

In 1944 there was set up a Morgan Woods Advisory Committee,

which included Dr. M. V. Roscoe, Dr. G. W. Scarth, Dr. Pierre Dansereau and Dean W. H. Brittain (Chairman), to which were later added Dr. J. L. Todd, Mr. E. E. Shaw, H. Scoggan (Secretary). The University provided an annual budget of \$7,000 to carry out the agreement which was considered to require a caretaker with one or more helpers. As this was not immediately available, it was arranged that the Department of Buildings and Grounds would supply such labour as would be required on a temporary basis.

The first meeting of the Committee was held on October 25, 1944, during which the different members expressed their views as to the future development of the Arboretum. This included three fundamental ideas which were to have a bearing on the future operation of the property. Dr. Scarth stated that after serious consideration, he had come to the conclusion that the area was too small to function as a preserve in the real sense. He further stated that he had a graduate student, Mr. Long, a trained forester with some experience who could make a survey of Morgan's Woods as a thesis problem. This, among other things, would involve the laying out of quadrats on which detailed studies of the vegetation would be made. He also stated that he had arranged with Dr. Delong for a soil survey of the area. Mr. Koroleff pointed out that there is no such thing as "accepted practice" but management. The point of first importance was how to foster a proper restocking with desirable species. The work would require at least the advice of an experienced forester on a consulting basis.

Dr. Dansereau stated that an "Arboretum" is generally understood to consist of an area more or less regularly planted with specimen trees to form a collection. He stated that the Morgan's Woods was not an "Arboretum" in this sense and could scarcely be made such. It did represent a collection of indigenous trees and he stressed the desirability of attaching labels to represent a species giving not only the name but other brief botanical and ecological information regarding each individual species. He pointed out that there were a number of acres of unwooded areas where further plantings could be made permitting growth studies to take place and "rounding off" the existing species.

On account of the absence of a number of members, there was no meeting in 1945 but a beginning was made to the woodcutting work. This was carried out along the Middle Road at the eastern edge of the woods and was confined entirely to the removal of over-mature and defective trees. The following season the cutting was continued in the area now known as "Maple Island" and also in a portion of East Grove.

In 1946 through the courtesy of the C.I.P., chief forester, Mr. Earl Shaw, became consultant to the advisory committee. His support and advice continued to guide our efforts until the appointment of a trained forester in 1955. In his initial report, Mr. Shaw insisted on the absolute necessity of an experienced woodsman in order that recommendations could be carried out satisfactorily. His advice was followed in the appointment of a Mr. Patterson, who, however, only stayed with us for a few months, having secured a more remunerative position elsewhere. However, before leaving he had cut sufficient hemlock logs to enable us to complete the building of Chalet Pruche which was to form the headquarters of the woodwork in the following year. Throughout this particular period, our sole mechanical equipment consisted of an old Bren gun carrier although later we obtained a second-hand Ford tractor which

was used for ploughing and cultivation when in working order.

During the second meeting held January 14, 1946, Dr. Scarth presented a preliminary report of Mr. H. D. Long's work giving a picture of the timber resources by tree species and distribution of timber sites, etc. Long's final report is included in full in the appendix of this report. Dr. Scarth also noted that he had arranged with Dr. Walter DeLong for a soil survey to be made of the whole area and the report of this survey, carried out by Messrs. Lajoie and Millette, is also included in the appendix. Dr. DeLong supplied a fine series of miniature soil profiles to include all the different types of soil found in the Arboretum area. Based on the above, three large scale maps were prepared to show the distribution of the species, soil conditions present and an undergrowth map superimposed upon the soils map.

The Chairman announced that Professor Ness had retired from the management of the area and that he (the Chairman) had taken over the duties of Curator. Due to the fact that the necessity of additional funds was pressing if plans for the development of the Arboretum as envisioned by the Committee were to be successfully carried out, it was decided that a special meeting of the Committee be arranged at which representatives of the forest industries be included. It was suggested that if they were convinced of the practical value of the arboretum project it might be possible to secure the desired funds.

Accordingly this suggestion was carried out. Mr. Koroleff undertook to see that the right people would be present. The meeting took place in the Board Room of the Pulp and Paper Institute in the Sun Life Building in Montreal on October 10, 1947, at which the following were present:

Dr. Pierre Dansereau
Mr. A. Koroleff
Dr. H. G. Scoggan
Mr. W. A. E. Peppler
Dr. Vernon Johnson
Mr. J. N. Stevenson
Mr. J. N. Anderson
Mr. E. E. Shaw
Dr. W. H. Brittain

The Chairman explained to those present the object of the meeting and dwelt upon the fact that farmers' woodlots and their development fell between two stools. Foresters were interested in forests. Agricultural specialists were interested in the improvement of crops and livestock. No one was interested or had the time to give attention to the woodlot management. The question of woodlots, he pointed out, was part of the larger problem of soil conservation and use and that it was essential that this particular component should now be given the attention which it deserved. After considerable discussion it became apparent that the majority present were of the opinion that since the problem was mainly agricultural and of only minor interest to the wood producing industry, the latter could not be expected to support such a project. The opinion was that on any permanent basis the Department of Agriculture was the proper agency to support such a project. The Chairman stated that regardless of what others might do in respect to the present proposal,

Macdonald College would, within the limits of its means and resources, continue to give what support it could to the project and persevere in its attempts to find more adequate means to carry on with the work. He gave reasons for his conviction that it would be unrealistic at the present time to expect support from Departments of Agriculture. Following this expression of intent, Verne Johnson decided to contact members of the forest industry to obtain their support. This he was able to do in an outstanding manner and from this time forward, the industry have provided substantial financial assistance to the project; this largely because of Verne's dynamic leadership and interest.

The year 1947 marked the advent of Mr. R. Ferguson ("old Bob") to the Arboretum. Having but a single hand and also being almost stone deaf, "old Bob" brought new life into the activities in the woods and to the planting plans which began in earnest at this time. His efforts deserve a special tribute at this point. Bob remained until the beginning of 1950, his service overlapping that of Mr. R. Watson, who took over in 1948 and who has remained as foreman from that date.

The regular 1947 meeting continued the discussion carried out at preceding meetings and it contained the first mention of the desirability of offering a course of instruction in Woodlot Management at the university level.

In 1948 the following plants were obtained:

White spruce	12,000
Norway spruce	2,500
White cedar	4,350
Tamarack	2,000
Red pine	7,280

The spruce and red pine were placed in the softwood field where they had to compete with an extraordinary vigorous growth of grass, yellow rocket and other weeds. In fact, so great was the loss, except on the edges of the field, that the seedlings were dug up, planted in the nursery for a season, the whole area ploughed and harrowed and replanted a year later.

During this same year transplants of the following were received from the Berthierville Nursery:

Japanese Larch	200
European Larch	75
Siberian Larch	25
Black Hills Spruce	50
Red pine	200
Red spruce	300

The red spruce, obtained from Nova Scotia, did not do well in this environment and only a remnant survived.

There were also planted in the year 1948

Red spruce (largely a failure)	4,000
White spruce	800
Ash	500
Black Spruce from Clova, Quebec	2,000
Japanese Larch	2,000

Following this period it does not appear to be necessary to relate any of the high spots that have occurred until 1955. During this period the process of planting was continued as rapidly as possible until almost the entire available area had been reforested. The main planting took place in the early years and was virtually completed before 1955.

During most of this period the harvest of wood products during the winter months was accomplished by borrowed horses after which we secured an old horse of our own for this purpose. In the meantime a satisfactory tractor had been obtained which was available for ploughing, cultivating, and general work. Following 1948 there is no record of further meetings of the advisory committee having been held but the process of planting and wood cutting was carried out with the advice of Mr. Shaw. During 1948, however, marks the beginning of an active program of setting out floral groups. At first these plants were obtained through the generosity of the Montreal Botanical Garden and consisted of Douglas fir, Japanese spruce (*Picea koyamii*), Norway spruce, Lodgepole pine and a few other trees. Again most of the floral groups had been set out before the year 1955 although since then smaller numbers have been set out from time to time.

Wood cutting continued under the direction of Mr. Watson together with two permanent helpers. While in the summer months, planting, maintenance work including the erection of fences between the farm property and the Arboretum were carried out.

A course in Woodlot Management on a temporary basis was given in the year 1954 by Mr. Leif Holt. The course was confined, however, to the Diploma Course students.

During 1955 a forestry graduate was appointed as lecturer in Woodlot Management together with the actual oversight of all activities in the Arboretum. His appointment was the final act in establishing a course and Department of Woodlot Management and the Arboretum entered a new era.

One final word regarding an historic occasion which took place on October 14, 1949, which was the dedication of the Morgan Arboretum. The central event of this dedication was the unveiling of a plaque attached to a large boulder in memory of the late Mr. James Morgan and his son, Harold, who preserved the trees and land in Morgan's Woods, which might otherwise have been broken up into lots for sale. Next, the late Mr. Cleveland Morgan gave a short address outlining the early history of the woods in which he noted that the major event giving rise to their purchase was the occasion of a wood famine in Montreal. At that time, it will be remembered, that wood was the main fuel for heating and domestic purposes. The actual unveiling of the memorial was made by Dr. F. Cyril James, Principal of McGill University. Afterwards the distinguished guests present proceeded on an inspection of the woods under the guidance of Dr. W. H. Brittain, the then Curator of the Arboretum and Dean of the Faculty of Agriculture.

FORESTRY AND TOURISM IN SASKATCHEWAN

Saskatchewan is well known for its wheat production problems but the province also contains substantial forest, game and water resources which annually attract many thousands of visitors. During and following a two-week canoe trip in central Saskatchewan (see Weekend Magazine, Nov. 15, 1969), an impression was gained of the vastness of the potential for forestry and tourism. There are three distinct regions in the Province.

The short and long-grass prairie south of Saskatoon comprises in area about one-third of the 250,000 square miles that make up the Province. This is Canada's bread basket; 40 percent of the nation's cultivatable land is located in the Prairies. Agriculture is by far the most important industry in Saskatchewan with about 75% of the commercial farms producing wheat, whereas, in Quebec, 63% are dairy farms. Many of the wheat farms are now converting to beef and grass as wheat surpluses force landowners into other types of production. Farms on the average are much larger than those in Eastern Canada and the province contains more than two-thirds of the country's wheat acreage. Mining of potash, coal, oil and natural gas are also important. The Department of Natural Resources is developing camping and recreational areas in this southern agricultural zone. These developments are centered on the South Saskatchewan River. With its source in the Rockies and draining to Hudson Bay through Manitoba, the Saskatchewan was the Indians' highway long before the fur trade opened up the West. The damming of this river, begun in 1958, was completed 10 years later. Giant Gardiner Dam, the largest earth-fill dam in Canada, stretches 3 miles across the valley and created 150 mile-long Lake Diefenbaker. This dam and water body provide hydro electricity and irrigation, an urban water supply and southern Saskatchewan's newest recreation land for campers, picnickers, fishermen and boating enthusiasts. Government forestry is concerned with providing a suitable environment for these activities. With annual precipitation seldom reaching 10 inches per year on top of periodic droughts, arid-land forestry practices aim at preserving moisture by fallowing and clean cultivation. These measures reduce water and vegetative competition for trees planted for shelter and aesthetic purposes in the camping and recreational areas. The more successful species are green ash, Manitoba maple, siberian elm, hybrid poplar and Colorado spruce and various hardy shrubs, such as caragana, Russian olive, elder, chokecherry, Rocky Mountain juniper, ninebark, lilac, almond and cornus varieties. This wide variety of species, initially dense planted then heavily thinned after four years, has been effective in ensuring tree survival. Native vegetation in this dryland region is confined to isolated pockets of aspen, black poplar and willow. This droughty country and the adjoining aspen-parkland offers the province's finest sharp-tail grouse and Hungarian partridge hunting as well as being home for the antelope, mule and white-tailed deer. The abundance of grain attracts massive fall concentration of ducks and geese which flock to this major waterfowl flyway and provides sport for hunters and wildlife watchers from across the continent. Drought is also a major problem in maintaining waterfowl numbers as the drying of shallow ponds and potholes kills the young ducks. Ducks Unlimited have spent more than \$17,000,000 in a dedicated effort to preserve the water resources and habitats of the prairie through the building of more than 900 dams,

weirs and deep ponds. These impoundments serve to attract a million and more visitors who come annually to see and harvest the duck crop. The water reservoirs also provide for fishing and varied water sports.

North of the Prairies lies the aspen parkland — jack pine transition forest. This is an unique transition zone between the open prairie and the vast boreal forest that stretches from coast to coast. Increased precipitation in this level to rolling countryside supports sloughs and pot-holes in the depressions with scattered stands of aspen interspersed with open rangeland. The aspen parkland is being gradually cleared off as this is the most productive land for wheat and beef in the Province. Forest industry processing plants are all located in the aspen parkland or on its borders. Several chipboard mills process aspen from the region and the first pulp mill in the province opened in 1967. The Prince Albert Pulp Company has cutting rights on 18,000 square miles to the north of Prince Albert. The logging is being conducted for the first four years of operation by a Crown Corporation. Trucks haul twenty-cord tree-length loads south from the Company's limits on a specially constructed resources highway bringing spruce and jack pine to the Prince Albert mill around the year. This road has been pushed north of Lac La Ronge across the historic Churchill River and is helping to open up the tourist potential of northern Saskatchewan. A substantial amount of Indian labour is now in use in these forest operations. Incidentally Saskatchewan has the largest Indian population of any of the provinces. Many of these are still living in the traditional way subsisting on the returns from fishing, hunting and trapping for much of the year. Through the courtesy of the forestry staff of the Department of Natural Resources in Prince Albert arrangements were made to visit points of forestry interest in the region. At the moment private forest area and production are of minor size and importance to currently established forest industry. Some quantities of aspen and white spruce are purchased but primary use for home-grown timber is in farm construction and repairs. This may change somewhat as new industry becomes established. A second major forest processing complex (Athabaska Forest Industries) consisting of a saw-mill and pulp mill has just been announced for the Meadow Lake-Doré Lake area of the Province. This complex will tap the currently under-developed forest potential of northwestern Saskatchewan. The Provincial Government has established a million tree nursery at Big River near Prince Albert and here are grown much of the stock for afforesting the recreational areas to the south. Prince Albert National Park is found in the region as are a major number of well-developed provincial parks. This network of parks is now receiving an increasing number of out-of-province visitors.

Beyond the aspen parkland transition forest lies the most northerly third of the province. The untamed, fire-scarred Boreal forest and the mineral-rich Pre-Cambrian Shield. Because of their distant location these resources remain as yet relatively undeveloped. Uranium deposits and mineral exploration in general have sparked intense activity on the province's northern border. Already tourism in the form of hunting and fishing lodges are encroaching on the more accessible parts of this remote terrain. Fly-in fishermen and hunters are now competing with the nomadic Indians who must live from their take of the fish and game resources of the region. This frontier offers the most attractions for those interested in wildlife and waterfowl and unspoiled scenery. The countless

lakes and rivers provide outstanding opportunities for wilderness travellers to get away from developed parks and camping areas. Bear and moose, wolf and caribou, ducks and geese, white pelicans and soaring eagles delight the passing traveller as pollution has yet to take its toll of these fragile elements of the northern environment.

In the matter of pollution, Saskatchewan seems to be better regulated than most provinces. Potash developments in the agricultural zone are under firm control but salt migration from tailing ponds and oil refineries are creating localized difficulties. Low densities of population are offset by limited precipitation, short free-flow periods in rivers and waste from base metals, steel, pulp, canning and food processing industries. Pesticide and soil pollution generally are significant since the province has 40% of the cultivated land area of Canada. Grasshopper outbreaks led to wide use of dieldrin and aldrin in 1957-1964 with definite implications for soil pollution and food residues. Limited run-off has helped Saskatchewan contain this aspect of pollution and significant efforts to educate public opinion appear to be having an effect.

Woodlands Improvement

During the 1969-70 season cutting of dead elms continued although some trees still remain on boundary lines. The main improvement cutting effort was concentrated in the Hickory Grove (Block VIII) with some clean-up work in the North and Skinner Groves (Blocks XVI and XII). Another strip was clear cut in Block XIV.

Wood Production

<i>Grove</i>	<i>Firewood*</i>	<i>Pulpwood**</i>	<i>Sugar wood**</i>
Hickory (VIII)	115	9	20
Skinner (XII)	5		3
North (XVI)	5		2
East (XI)		3	
Plantations		6	
	125	18	25

*18-inch face cords

**Standard cords

Purchase wood — for resale

Co-operators in the Huntingdon County Woodlot Assistance Project have continued to supply wood for resale by the Department of Woodlot Management. To date in 1969-70 we have purchased 85 cords of 18-inch mixed hardwood with total purchases expected to reach 150 cords by the time the 1970 deliveries begin.

In 1969-70 fireplace wood sales of 263 cords brought returns of \$5,809.

Nurseries and Plantations

Emphasis in nursery and plantation work continued to shift gradually. Planting of birches in the various collections approached completion and we are beginning to replant areas where trees have been sold or where original planting were unsuccessful. Certain additions are made

each year to the arboretum collection. Stocks of interesting plant material have been greatly increased by the propagation of cuttings. These were made by the foreman, R. J. Watson. This work was made possible by the greatly appreciated assistance of Mr. J. B. Morgan who permitted the use of his greenhouse facilities and the advice and help of Mr. H. Kouwenberg. A useful exchange of plant material was made with the Montreal Botanical Gardens.

Some of the earlier plantations are now reaching a stage where thinning and pruning are required and these activities are absorbing an increasing amount of effort. Thinnings produce a variety of products; landscape trees, Christmas trees, pine boughs, and pulpwood have all been produced and the flow will grow in volume.

Sales of Trees and Shrubs

The members' plant sale on May 8 and 9 was late in relation to plant growth and much material was dangerously advanced. By careful handling, however, we hope to have kept losses at the usual low level. A larger total value of ornamental trees and shrubs was available but variety was somewhat restricted. Sales of surplus trees for landscape and ornamental use continued throughout the year.

Revenues from Sales of Trees and Shrubs

Members' plants sale.	\$1,800.00
Landscape and ornamental trees.	8,000.00
	\$9,800.00

Plantation Research

Observations on several planting experiments continued. The assessment of Scots pine strains for Christmas tree production, recording of data on growth and cone production by special Scots pine clones, measurement of growth of several species in the ridge-planting experiment, and observations of growth and development of the mixed plantation of European larch and Norway spruce were carried out.

Christmas Tree Sale

Results of the 1969 sale of Christmas trees, pine boughs, and firewood were a slight disappointment. Returns dropped below the 1968 level, possibly because despite our earlier plans, we had less variety in trees to offer.

Summary Christmas Tree Sale

<i>Item</i>	<i>No.</i>	<i>Revenue</i>
Christmas trees		
Scots pine.....	636	\$3352.00
Spruce*.....	200	460.25
Pine boughs.....	467	492.00
Firewood.....		271.25
Misc.....		11.70
Gross returns.....		\$4587.20**
Net returns.....		1412.60

*All spruce cut in Morgan Arboretum thinning and salvage work.

**Members	\$3200.45
Non-members	1386.75

Research on Artificial Christmas Trees

Data obtained in a Toronto study of Christmas tree preferences indicate that natural trees have lost a lot of ground to imitations.

Survey Results

<i>Category</i>	<i>Central Toronto</i>	<i>Suburban Toronto</i>
No tree	40	19
Natural tree	30	45
Imitation tree	30	34
Combination	0.5	1.6

On this same topic the American Christmas Tree Journal (May, 1970) carries a feature entitled "Report on a Strong Substitute — the Artificial Christmas Tree". Sales in the U.S. are between \$48 and \$72 million annually or 25% of the total Christmas tree retail market.

Maple Activities

Syrup production was 490 gallons in 1970 from 3465 taps. Once again the season was short, and with the addition of four sugaring parties, pressure was heavy on the staff.

Production Data 1961-1970

<i>Year</i>	<i>No. of taps</i>	<i>Total Galls. syrup</i>	<i>Taps/Gall.</i>	<i>Lbs. of sugar per spout</i>
1961	2605	281.0	9.3	0.99
62	2626 (150 P/L)	309.0	8.5	1.08
63	2871 (480 P/L)	371.0	7.7	1.19
64	2793 (911 P/L)	353.5	7.9	1.14
65	2850 (932 P/L)	250.5	11.4	0.81
66	2818 (728 P/L)	512.0	5.5	1.67
67	3231 (930 P/L)	422.0	7.7	1.34
68	3230 (1430 P/L)	370.0	8.7	1.15
69	3230 (1658 P/L)	475.0	6.8	1.35
70	3465 (1660 P/L)	490.0	7.1	1.32

10-year averages to 1970

Gallons of syrup/year	383
Spouts per gallon	7.0
Lbs. of sugar per spout	1.3

Taps on tubing remained the same while there was an increase of 235 taps with spouts and buckets. In the 1969 and 1970 seasons many young trees have come into production, more than offsetting losses of overmature maples. This increase results from long term work to promote development of young sugar maples.

Electricity was provided by a rented portable generator and the same pumps were used in vacuum pumping. Pumping results in 1970 were unsatisfactory and we have concluded that a major change in approach is indicated. Our results over the years and results obtained by Dr. R. Morrow indicate that the transfer of compressor-induced vacuum to automatic dumping units holds the best promise. We are convinced

that high vacuums are not practical in what must be, at best, a leaky system.

North Grove sap yields from 6-inch and 18-inch drop systems were compared for the third season. For the third time the yields were similar indicating that shorter drops may be used, if convenient, without loss in yield. However, it has been found that the longer drops, while more expensive, are easier to work with and consequently would probably be more efficient. Once again squirrel damage was not a problem and plans to observe and study squirrel activity were foiled.

Tests of two natural flow tubing methods were repeated in the four 60-tree test groves. One of the 24 comparisons was excluded and in 18 of the 23 remaining yields from the unvented lines were higher. Overall the unvented systems produced 10% more sap.

Superior yields from unvented systems are in line with findings elsewhere. Natural vacuum is believed to be the cause. We have not found more than slight evidence that it develops but workers in the U.S. have shown that it does. It seems probable that our 10-tap test lines are too short for development of readily measured natural vacuum.

Analysis of the 1970 results is still not completed but we are accumulating a useful body of data on the test groves by our experiments.

A major re-arrangement greatly improved the 700-tap Quarry Grove tubing system. Although our pumps were not powerful enough to create the vacuum we hoped for here gravity flow was sufficient to compensate to a large degree and per tap yields were acceptable though lower than the average.

The maple research work has been supported in part by several agencies. Grants from the Canada Department of Agriculture and the Quebec Agricultural Research Council have been of great value. Materials have been supplied by the tubing manufacturers.

WOODLOT ASSISTANCE — CHATEAUGUAY VALLEY

The field inventory of the physical resources of each owner was subdivided into an initial survey, a cut-over cruise, value appraisals for each forest cover type, and the presentation of three alternative management plans based on this data. These plans are carefully tailored to the individual owner's needs and objectives. This data together with an air-photo map, a cover-type description and a detailed outline of the management prescriptions have been sent out to the respective owners for their information and modification where necessary. These plans are then discussed with each owner to try and fit them most effectively into their respective total enterprises.

This year also saw the completion of a potential productivity study of even-aged stands of soft maple in the region. This research took place on selected sites where coppice soft maple stands predominated. Sample trees from each diameter class were felled, sectioned at 8 foot intervals and the stand growth history reconstructed by 5-year intervals back to the time of establishment. This stem analysis data was then computerized to produce growth curves and estimates of the potential productivity of the selected sites. These calculations and projection print outs suggest capabilities for land-use purposes for the region. All cooperator cover types that contain predominantly soft maple stands can now be evaluated in this way and the potential production for the region determined.

The field work on this project should be completed this coming summer. Each cooperator will then have an outline of his woodland resources with alternative proposals as to how the resource should be managed.

Manpower Courses

Members of the Department participated in two Manpower Courses, at Cowansville and Ormstown, during the year. The students in both courses were farmers hoping to upgrade their knowledge.

Three two-hour sessions at Cowansville, and two full-day sessions at Ormstown were held. In both courses numerous principles, problems, and possibilities in woodlot management were discussed in detail with vigorous participation by those taking the course.

DEPARTMENT AND ARBORETUM RESEARCH PROJECTS

I — RESEARCH IN THE MORGAN ARBORETUM

1. *Urban Forestry Studies*

The selection, use and demonstration of native shade trees for landscaping, beautification and to assist in the aesthetic enjoyment of outdoor recreation pursuits. (Departmental financing).

2. *Woodlot Management*

Economic levels, demonstration of three levels of woodlot management intended for owners of differing income levels — classed as marginal, commercial and conservation. The three methods are also being used for demonstration purposes and to obtain data regarding their viability. (Departmental financing).

3. *Management of Sugar Maple for Syrup Production*

A general study with special attention to development of a young stand of sugar maple. Potentially long term, this work is now in its third year. One phase is the intensive management of sugar maple. (C.D.A. support).

4. *Maple Sap Collection Studies*

Applied research involving plastic tubing systems for sap collection and featuring vacuum pumping systems. Objectives are to adopt, improve and develop most economic systems. (Q.A.R.C. support).

5. *Reforestation*

Small scale plantations of both coniferous and broadleaved species in the Morgan Arboretum are producing interesting results. (Departmental financing).

6. *Christmas Tree Culture and Marketing*

Cultural methods such as pruning, shearing and special protection are being tested and developed with a view to optimizing returns. Our organization is co-operating in observations of various Scots pine races, and in the special grafted clone study initiated by the Petawawa Forest Experimental Station tree breeding group. (Departmental financing).

7. *Timber Stand Improvement*

The Morgan Arboretum forest is under intensive management with regular cutting according to a management plan aimed at improvement in tree and stand quality and improved species composition. (Departmental financing with equipment grants from Terry Machinery, Chain Saw Division).

8. *Woodlot Protection*

Studies of various practices and use of materials for weed and grass control in plantation establishment, fire protection methods and water impoundment techniques. (Departmental financing in cooperation with Agricultural Engineering).

9. *Multiple Use*

The Morgan Arboretum forest is managed intensively for wood products. It is also used intensively for outdoor recreation by the Morgan Arboretum Association membership. Records of forest management and recreational activity constitute an important source of information on multiple use. (Departmental financing).

10. *Effects of Rodents on Maple Operations*

Studies of rodent damage to maple sap collecting devices and methods of control and protection of such installations. (Departmental financing with some equipment grants from suppliers of tubing).

11. *Survey of Turtle Populations in a Farm Pond*

This study is conducted to determine carrying capacity, growth, etc. of the turtle population in a natural pond on the Stock Farm, Macdonald College. (Departmental financing).

12. *Forest Owner and Forest User Cognition of and Affection for the Forest Environment*

Through contact with woodlot owners, school children and members using the Morgan Arboretum for nature tours and recreation to study the economic and aesthetic importance of the forest resource to the individual and society. (Departmental financing and the Garnet Strong Memorial Fund).

All the above projects have importance outside the Arboretum. Many of these are going on in the Arboretum primarily because of the existence of the area. A few are funded by outside agencies.

II — RESEARCH OUTSIDE THE ARBORETUM

1. *Studies of Betula Species*

Cyto-genetics and Taxonomy of the White-Barked Birches of Canada. Extensive herbarium and living collection in the Morgan Arboretum. (N.R.C. support).

2. South-Western Quebec Woodlot Study

Technical assistance to owners of wooded lots. A study of the degree to which technical assistance can favourably affect returns and production from improved woodlot management. (Quebec A.R.D.A. support).

3. Soft Maple Productivity Study

By means of stem analysis and the application of a projection model — potential productivity of soft maple (*Acer* spp.) second-growth stands are predicted for a variety of imperfectly drained soils.

Periodic annual increments will help to establish the economic returns on the various soils. From the growth curves produced from the detailed stem analysis information assisted by computer inputs — management prescriptions can be given. The data from this study is adding useful information to a large-scale hardwood productivity study. The calculations can suggest capabilities for land-use purposes.

4. Community Ecology and Population Studies

Between three and five graduate students and assistants are working on studies of animal activity in forested communities at the Lac Carré Wildlife Station (south-east of Mont Tremblant Park) using the sand-transect method and other techniques to monitor and analyse ecological situations. (N.R.C. support).

5. Biological Control of the Larch Sawfly

A crew (including 1 party chief and 3 assistants) are evaluating the effectiveness of the biological control of larch sawfly (*Pristiphora erichsonii* (Htg.)) by shrew (*Sorex* spp.) populations at Red Indian Lake, Newfoundland. (E.M.R. Dept. of Fisheries and Forestry support).

6. Pesticides Research

One student engaged in an evaluation of pesticide effects on animal populations in conjunction with the hemlock looper spray programme at Buchans, Newfoundland. (Canadian Wildlife Service support).

7. Improved Interpretation Programs

To introduce the sand transect technique for the improvement of nature interpretation programs in the National Parks across Canada. (National Park and Canadian Wildlife Service support).

All of the above projects have importance to renewable resources management and development in Canada.

III — OTHER RESEARCH

The development and maintenance of a selected bibliography for use in Woodland Resources Ecology. This to include selected popular and technical literature on: tree identification, protection, silviculture, planting, woodland management, measurements, Christmas trees, maple syrup, logging, environmental forestry, conservation of renewable resources, wildlife ecology and management, outdoor recreation and water resources.

PUBLICATIONS

During the year members of the Department have prepared and published the following articles, papers and reports that might be of interest to the membership:

- Brittain, W. H. and Grant, W. F. Observations on Canadian Birch (*Betula*) Collections at the Morgan Arboretum. VIII. *Betula* from Grand Manan Island, New Brunswick. *The Canadian Field-Naturalist*, V. 83, No. 4, 1969, pp. 361-383.
- Bider, J. R. (Doucet, G. J. and Bider, J. R.), Activity of *Microtus pennsylvanicus* related to moon phase and moonlight revealed by the sand transect technique. *Canadian Journal of Zoology*, V. 47, No. 6, 1969, pp. 1183-1186.
- The Last Word (An Ecologist's Perspective on the Pesticide Pollution Problem). *Macdonald Journal*, April, 1970. pp. 85-87.
- Jones, A. R. C. Annual Report, *Department of Woodlot Management, Macdonald College and the Morgan Arboretum Association*, 1969. pp. 1-30.
- and Lord, R. A. The Private Woodlot of Southwest Quebec. A Study of Ownership, Attitudes and Forest Practices. Information Report E-X-5. Forest Economics Research Institute, Department of Fisheries and Forestry, Ottawa. 1969, pp. 1-35.
- and ----- Studies of Private Forest Ownership in Southwestern Quebec. *Forestry Chronicle*, V. 46, No. 1, 1970, pp. 34-38.
- Review. *Forestry Chronicle*. V. 46, No. 2, 1970, p. 161.
- MacArthur, J. D. Multi-product Integrated Logging. *Pulp and Paper Manual of Canada*. Maxine Cooke, ed. Gardenvale, National Business Publications Ltd., 1969, pp. 24-26.
- Education for Recreation. *Macdonald Journal*, V. 31, No. 2, 1969, pp. 32-33.
- Woodharvesting Policies of Tomorrow. *Pulp and Paper Magazine of Canada*, V. 70, No. 15, 1969, pp. 37-38.
- Power Chain Saws: The Facts and the Future. *Pulp and Paper Magazine of Canada*, V. 70, No. 18, 1969, pp. 55-57.
- Quebec Black Spruce Research Forest Highlighted by Industry Cooperation. *Pulp and Paper Magazine of Canada*, V. 70, No. 23, 1969, pp. 41-43.
- A Switch to Tree Length Logging at Price Co. Ltd. *Pulp and Paper Magazine of Canada*, V. 71, No. 1, 1970, pp. 68-70.
- C-B Slashes at Roadside and Trucks to Railhead in Camp Nicauba Operation. *Pulp and Paper Magazine of Canada*, V. 71, No. 4, 1970, pp. 72-73.

FUTURE PLANS

The future of the Department is tied to the proposals submitted in the New Orientation for the Faculty of Agriculture Committee report. In that proposal a change of name to Woodland Resources Ecology was proposed which would more accurately represent the work and interests of the Department. The Department is now specializing in the management of non-agricultural lands for forestry and wildlife ecology in regions where land and people are closely related. The area of interest comprises the woodland ecosystem. Those parts of the forest ecosystem that extend from the urban mini-forest and the fringes of suburbia to include all non-agricultural land in which people are involved. In this region where population pressures are greatest and expanding, where conflicts in land use are sharpest and escalating, and efforts to maximize the use of land for present benefit while leaving options for the future open are most obviously needed.

The need for research on land use problems and training of people to lead in efforts to solve them is obvious. The Department's major interests are in the use of non-agricultural land for goods such as timber, fibre, fur and game, for services such as recreation, amenity and protection and for various combinations of the two that may be both possible and desirable. The development of both consumptive and non-consumptive uses of this type of land is the area of challenge.

Forestry is no longer concerned solely with the production of wood as raw material. It now recognizes that a real and growing demand exists for non-material, or intangible benefits such as aesthetics, wild domain and recreation opportunities from the forests. This pressure is strongest on forests and non-agricultural lands near population centres. This change in the role of trees and forests in the environment would be emphasized in the forestry courses offered to undergraduates. The objective to teach and develop information on the values and importance of environmental forestry (i.e. use of forest land for amenity, protection and recreation) as well as production forestry (i.e. use of forest land for wood products and forage).

Similarly wildlife has taken on a new aura. Wildlife biologists no longer deal only with management, protection and biology of game and fur-bearing animals. They now face a much broader spectrum of tasks which include: management of game and non-game species for consumptive and non-consumptive uses, development of broader recreation resources — from wildlands to museums, the study of sociological attributes of consumer, producer, researcher and enforcement officer, the study of various physical and biological factors which affect the numbers of the stocks, the study of indicators of environmental degradation, the development and dissemination of information relating to matters of environment — and particularly man's effect on it.

Rapidly growing awareness of the accelerating deterioration of the environment and also the potential of ecology suggests that wildlife should become a substantial centre of activity on the campus. Macdonald has yet to commit itself to a well-defined and structured curriculum for the training of wildlife ecologists but with very little modification a broadly-based undergraduate wildlife resource ecology pro-

gram could be offered. Graduates should be capable of contributing to planning teams, for multiple use programs, for land use development and for the improvement of recreational resources such as park planning. They should be capable of undertaking and developing information and educational services relative to recreation, such as nature interpretation services within parks and nature centres. They should be capable of making valuable contributions to the public relations departments of resource-based industries, by being able to develop opportunistic programs as a by-product of industrial resource utilization (such as recreational development of harvested woodlands and hydro reservoirs). They should be capable of fulfilling roles in wildlife services, particularly of sociological and economic as well as biological factors. They should be prepared to work in pollution abatement or monitoring programs.

It is thus proposed that the Department's name be changed to:

- i) Woodland Resources Ecology
- ii) That this be a part of the Resources Development Stream proposed in the New Orientation Committee report.
- iii) That an undergraduate Wildlife Ecology major be offered.
- iv) That graduate programs continue to be available in Wildlife Ecology and Woodland Resources.

It is hoped that it will be possible to proceed with the development of this program at an early date.

The preparation and compiling of this Annual Report has been a team effort and the contribution of all members of the staff in its publication is gratefully acknowledged.

A. R. C. Jones,
Chairman,
Department of Woodlot Management.

DEPARTMENT OF WOODLOT MANAGEMENT AND
MORGAN ARBORETUM and WOODLAND DEVELOPMENT
ASSOCIATION

Interim Statement of Income and Expenditure
June 1, 1969 to April 30, 1970

Income

Contributions from members (including gate receipts)	\$23,848.
Income from sales	22,264.
Interest on Reserve	1,377.
McGill Contribution	22,000.
	\$69,489.

Expenditure

Ordinary	21,616.
Non-recurring	1,237.
Fixed	910.
Salaries and wages (including employee benefits)	73,324.
	\$97,087.

Estimated Income and Expenditure 1970-71

Contributions from members	\$25,000.
Income from sales (as per Budget)	22,000.
Interest on Reserve	700.
McGill Contribution	24,200.
	\$71,900.

Estimated Expenditure
Budget for 1970-71

\$125,075.

W. C. Shipley,
Secretary-Treasurer.

May 31, 1970